



March 15th, 2023

Cheryl Laskowski, Ph.D.
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Re: Low Carbon Fuel Standard February 2023 Workshop

Dear Dr. Laskowski,

ICF is a non-partisan, non-political company that delivers a broad and diverse range of independent, unbiased, objective analyses and related consulting services to help its clients meet their missions.

ICF is supporting a coalition of interested parties representing a diverse mix of low carbon fuel producers seeking to understand the potential carbon intensity reduction that could be achieved assuming the likely aggregate deployment of low carbon fuels and supporting technologies. Through a consideration of various factors, the project is seeking to quantify what CI target may be achievable in 2030. Furthermore, the project will develop a clearer understanding of the potential interim CI reduction targets that could be achieved between 2030 and 2045. ICF's work should not be construed as ICF's endorsement of any policy or any regulatory, lobbying, legal, or other advocacy position, organization, or political party. Furthermore, any conclusions presented by ICF do not necessarily represent the policy or political views of ICF.

Background

The California Air Resources Board (CARB) is considering setting more ambitious Low Carbon Fuel Standard (LCFS) targets to increase the stringency of the carbon intensity (CI) requirements of the program, thereby achieving more significant greenhouse gas (GHG) emission reductions in support of California's pursuit of economy-wide carbon neutrality

no later than 2045. The current LCFS program includes a linear decrease from the current year (2023) target of 11.25% to 20% by 2030 (with the target being relative to 2010 levels).

The objective of this ongoing analysis is to demonstrate the levels of CI reduction that could be achieved for the LCFS program under different market conditions and considerations and at what cost. The intent of scenario modeling is to help inform policy development, but it is neither meant to be deterministic with respect to the shape and/or design of any policy, nor is it meant to be prescriptive with regards to compliance. Furthermore, the results are not meant to be predictive forecasts. ICF's analysis will include multiple strategies that are designed to reduce the CI of transportation fuels.

The modeling described herein differs from the modeling that CARB staff is conducting using the California Transportation Supply (CATS) model. Specifically, CATS is described as a "transportation fuel supply optimization model" that "minimizes the cost of supplying fuel to meet demand in each year." In other words, given certain modeling constraints, namely a specific CI reduction trajectory and associated policy constraints, the CATS model optimizes compliance accordingly. The CATS model is designed to answer the question: *What is the least-cost compliance pathway associated with a CI target of X in year Y?* ICF's modeling exercise, however, is seeking to provide clarity about what those CI targets could be, given existing state policies and the likely aggregate deployment of low carbon fuels and supporting technologies.

ICF Methodology

ICF is modeling the CI reductions that could be achieved using the structure of the LCFS program. The modeling is driven by the demand for transportation fuel in California, which is a function of many variables including but not limited to economic growth, vehicle miles traveled (VMT), vehicle fleet turnover, and the expected compliance with complementary policies that impact transportation fuel demand. ICF's modeling is initiated using documentation associated with the Emissions FACTor model (EMFAC)¹ that is publicly available for download. The EMFAC model is "developed and used by CARB to assess emissions from on-road vehicles including cars, trucks, and buses in California." The EMFAC model enables ICF to characterize top-level transportation fuel demand in California given baseline consideration of the aforementioned key factors, like VMT and fleet turnover. Although EMFAC2021 incorporates expected compliance with several regulations that decrease fossil fuel demand, like the Advanced Clean Truck (ACT) Rule and the Innovative Clean Transit (ICT) Rule, it does not include expected compliance with Advanced Clean

¹ ICF is using the most recent version of EMFAC, EMFAC2021 as a starting point for our modeling. The EMFAC model is available for download [online](#).

Cars II (ACC2), which was adopted by the Board in 2022. ICF has modified EMFAC2021 to ensure compliance with ACC2. ICF then pairs the fleet turnover and fuel demand functions of EMFAC with supply-cost curves for low carbon fuels, including ethanol, biodiesel, renewable diesel, and renewable natural gas (RNG). Neither electricity nor hydrogen are considered as part of a traditional supply-cost curve like with the liquid and gaseous biofuels modeled. The modeling for these fuels focuses on the CI of the fuel, and how it may change over time, rather than any supply limitations.

Stakeholder Outreach

ICF retains exclusive decision-making with respect to the parameters that are included in (or excluded from) the modeling in this project. However, as part of the development of our modeling, we sought (and will continue to seek) input and feedback from stakeholders that are uniquely positioned to characterize trends, constraints, and opportunities across various low carbon fuels. ICF conducted interviews with stakeholders from various low carbon fuel providers. Through these conversations, ICF introduced the broader project objectives and ICF's modeling approach to help stakeholders understand the key drivers for our analysis. ICF then led a discussion guided by the following questions:

- **Deployment.** What are expected changes in the industry that will increase or decrease the deployment of a particular fuel or fuel/vehicle combination? These generally include supply and demand considerations and should account for opportunities and barriers to the extent feasible. What is the timeframe associated with any changes?
- **Carbon intensity.** What is the current and projected carbon intensity of the fuel under consideration? Are there any California-specific policy or regulatory changes that can be accommodated to help achieve these reductions? What is the rate at which these carbon intensity changes are likely to occur?
- **Demand from Other Markets.** Where are the developments likely to occur? Are there any specific advantages or disadvantages associated with delivering these solutions to California that ICF needs to consider? To what extent will other (existing or potential) low carbon fuel markets be advantaged or disadvantaged as it relates to these solutions as a function of their corresponding geography?

Lastly, it is important to note that ICF has developed the modeling framework used in this study based on publicly available tools and data—we have purposefully excluded any proprietary data or considerations at this time. ICF's final report will include more detailed data and sourcing to ensure that we meet the transparency expectations of stakeholders.

ICF will be working with our client(s) to share the result of our analysis with CARB and other interested stakeholders expeditiously. We look forward to collaborating with CARB and interested parties to the extent that it is appropriate.

Sincerely,

Philip Sheehy, PhD
philip.sheehy@icf.com